



SEQUENCE LISTING

RECEIVED
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TECH CENTER 1600/2900

<110> Ludevid, Doloros
Torrent, Margarita
Alvarez, Inaki
Perez, Pascual

<120> Amino acid-enriched plant protein
reserves, particularly lysine-enriched maize gamma-zein, and
plants expressing such proteins

<130> 50062/004C01

<140> 09/117,246

<141> 1998-12-03

<150> PCT/FR97/00167

<151> 1997-01-28

<150> FR96/01004

<151> 1996-01-29

<160> 11

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<210> 1

<211> 44

<212> DNA

<213> Artificial Sequence

<220>

<223> based on Maize

<400> 1

cgatgaattc aaaccaaagc caaagccgaa gccaaaagaa ttca

44

<210> 2

<211> 46

<212> DNA

<213> Artificial Sequence

<220>

<223> based on Maize

<400> 2

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<210> 3

<211> 17

<212> PRT

<213> Maize

<400> 3

Ile Glu Phe Lys Pro Lys Pro Lys Pro Lys Pro Lys Glu Phe Leu Gln
1 5 10 15

Pro

<210> 4
<211> 28
<212> PRT
<213> Maize

<400> 4
Ile Glu Phe Lys Pro Lys Pro Lys Pro Lys Pro Lys Glu Phe Lys Pro
1 5 10 15
Lys Pro Lys Pro Lys Pro Lys Glu Phe Leu Gln Pro
20 25

<210> 5
<211> 20
<212> PRT
<213> Maize

<400> 5
Asp Gly Ile Asp Glu Phe Lys Pro Lys Pro Lys Pro Lys Pro Lys Glu
1 5 10 15
Phe Lys Leu Asp
20

<210> 6
<211> 672
<212> DNA
<213> Maize

<220>
<221> CDS
<222> (1)...(672)

<400> 6
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gcc acc tcc acg cat aca agc ggc ggc tgc ggc tgc cag cca ccg ccg 96
Ala Thr Ser Thr His Thr Ser Gly Gly Cys Gly Cys Gln Pro Pro Pro
20 25 30
ccg gtt cat cta ccg ccg ccg gtg cat ctg cca cct ccg gtt cac ctg 144
Pro Val His Leu Pro Pro Pro Val His Leu Pro Pro Pro Val His Leu
35 40 45
cca cct ccg gtg cat ctc cca ccg ccg gtc cac ctg ccg ccg ccg gtc 192
Pro Pro Pro Val His Leu Pro Pro Pro Val His Leu Pro Pro Pro Val
50 55 60
cac ctg cca ccg ccg gtc cat gtg ccg ccg ccg gtt cat ctg ccg ccg 240
His Leu Pro Pro Pro Val His Val Pro Pro Pro Val His Leu Pro Pro
65 70 75 80

cca cca tgc cac tac cct act caa ccg ecc cgg cct cag cct cat ccc	288
Pro Pro Cys His Tyr Pro Thr Gln Pro Pro Arg Pro Gln Pro His Pro	
85 90 95	
cag cca cac cca tgc ccg tgc caa cag ccg cat cca agc ccg tgc cag	336
Gln Pro His Pro Cys Pro Cys Gln Gln Pro His Pro Ser Pro Cys Gln	
100 105 110	
ctg cag gga acc tgc ggc gtt ggc agc acc ccg atc ctg ggc cag tgc	384
Leu Gln Gly Thr Cys Gly Val Gly Ser Thr Pro Ile Leu Gly Gln Cys	
115 120 125	
gtc gag ttt ctg agg cat cag tgc agc ccg acg gcg acg ccc tac tgc	432
Val Glu Phe Leu Arg His Gln Cys Ser Pro Thr Ala Thr Pro Tyr Cys	
130 135 140	
tcg cct cag tgc cag tcg ttg cgg cag cag tgt tgc cag cag ctc agg	480
Ser Pro Gln Cys Gln Ser Leu Arg Gln Gln Cys Cys Gln Gln Leu Arg	
145 150 155 160	
cag gtg gag ccg cag cac cgg tac cag gcg atc ttc ggc ttg gtc ctc	528
Gln Val Glu Pro Gln His Arg Tyr Gln Ala Ile Phe Gly Leu Val Leu	
165 170 175	
cag tcc atc ctg cag cag cag ccg caa agc ggc cag gtc gcg ggg ctg	576
Gln Ser Ile Leu Gln Gln Gln Pro Gln Ser Gly Gln Val Ala Gly Leu	
180 185 190	
ttg gcg gcg cag ata gcg cag caa ctg acg gcg atg tgc ggc ctg cag	624
Leu Ala Ala Gln Ile Ala Gln Gln Leu Thr Ala Met Cys Gly Leu Gln	
195 200 205	
cag ccg act cca tgc ccc tac gct gct gcc ggc ggt gtc ccc cac tga	672
Gln Pro Thr Pro Cys Pro Tyr Ala Ala Ala Gly Gly Val Pro His *	
210 215 220	

<210> 7

<211> 223

<212> PRT

<213> Maize

<400> 7

Met Arg Val Leu Leu Val Ala Leu Ala Leu Leu Ala Leu Ala Ala Ser	
1 5 10 15	
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20 25 30	
Pro Val His Leu Pro Pro Pro Val His Leu Pro Pro Pro Val His Leu	
35 40 45	
Pro Pro Pro Val His Leu Pro Pro Pro Val His Leu Pro Pro Pro Val	
50 55 60	
His Leu Pro Pro Pro Val His Val Pro Pro Pro Val His Leu Pro Pro	
65 70 75 80	
Pro Pro Cys His Tyr Pro Thr Gln Pro Pro Arg Pro Gln Pro His Pro	
85 90 95	
Gln Pro His Pro Cys Pro Cys Gln Gln Pro His Pro Ser Pro Cys Gln	
100 105 110	

Leu Gln Gly Thr Cys Gly Val Gly Ser Thr Pro Ile Leu Gly Gln Cys
 115 120 125
 Val Glu Phe Leu Arg His Gln Cys Ser Pro Thr Ala Thr Pro Tyr Cys
 130 135 140
 Ser Pro Gln Cys Gln Ser Leu Arg Gln Gln Cys Cys Gln Gln Leu Arg
 145 150 155 160
 Gln Val Glu Pro Gln His Arg Tyr Gln Ala Ile Phe Gly Leu Val Leu
 165 170 175
 Gln Ser Ile Leu Gln Gln Gln Pro Gln Ser Gly Gln Val Ala Gly Leu
 180 185 190
 Leu Ala Ala Gln Ile Ala Gln Gln Leu Thr Ala Met Cys Gly Leu Gln
 195 200 205
 Gln Pro Thr Pro Cys Pro Tyr Ala Ala Ala Gly Gly Val Pro His
 210 215 220

<210> 8
 <211> 693
 <212> DNA
 <213> maize

<220>
 <221> CDS
 <222> (1)...(693)

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 Ala Thr Ser Thr His Thr Ser Gly Gly Cys Gly Cys Gln Pro Pro Pro
 20 25 30

 ccg gtt cat cta ccg ccg ccg gtg cat ctg cca cct ccg gtt cac ctg 144
 Pro Val His Leu Pro Pro Pro Val His Leu Pro Pro Pro Val His Leu
 35 40 45

 cca cct ccg gtg cat ctc cca ccg ccg gtc cac ctg ccg ccg ccg gtc 192
 Pro Pro Pro Val His Leu Pro Pro Pro Val His Leu Pro Pro Pro Val
 50 55 60

 cac ctg cca ccg ccg gtc cat gtg ccg ccg ccg gtt cat ctg ccg ccg 240
 His Leu Pro Pro Pro Val His Val Pro Pro Pro Val His Leu Pro Pro
 65 70 75 80

 cca cca tgc cac tac cct act caa ccg ccc cgg atc gaa ttc aaa cca 288
 Pro Pro Cys His Tyr Pro Thr Gln Pro Pro Arg Ile Glu Phe Lys Pro
 85 90 95

 aag cca aag ccg aag cca aaa gaa ttc aaa cca aag cca aag ccg aag 336
 Lys Pro Lys Pro Lys Pro Lys Glu Phe Lys Pro Lys Pro Lys Pro Lys
 100 105 110

 cca aaa gaa ttc ctg cag ccc ctg cag gga acc tgc ggc gtt ggc agc 384
 Pro Lys Glu Phe Leu Gln Pro Leu Gln Gly Thr Cys Gly Val Gly Ser
 115 120 125

acc ccg atc ctg ggc cag tgc gtc gag ttt ctg agg cat cag tgc agc	432
Thr Pro Ile Leu Gly Gln Cys Val Glu Phe Leu Arg His Gln Cys Ser	
130 135 140	
ccg acg gcg acg ccc tac tgc tcg cct cag tgc cag tcg ttg cgg cag	480
Pro Thr Ala Thr Pro Tyr Cys Ser Pro Gln Cys Gln Ser Leu Arg Gln	
145 150 155 160	
cag tgt tgc cag cag ctc agg cag gtg gag ccg cag cac cgg tac cag	528
Gln Cys Cys Gln Gln Leu Arg Gln Val Glu Pro Gln His Arg Tyr Gln	
165 170 175	
gcg atc ttc ggc ttg gtc ctc cag tcc atc ctg cag cag cag ccg caa	576
Ala Ile Phe Gly Leu Val Leu Gln Ser Ile Leu Gln Gln Gln Pro Gln	
180 185 190	
agc ggc cag gtc gcg ggg ctg ttg gcg gcg cag ata gcg cag caa ctg	624
Ser Gly Gln Val Ala Gly Leu Leu Ala Ala Gln Ile Ala Gln Gln Leu	
195 200 205	
acg gcg atg tgc ggc ctg cag cag ccg act cca tgc ccc tac gct gct	672
Thr Ala Met Cys Gly Leu Gln Gln Pro Thr Pro Cys Pro Tyr Ala Ala	
210 215 220	
gcc gcc ggt gtc ccc cac tga	693
Ala Gly Gly Val Pro His *	
225 230	

<210> 9
 <211> 230
 <212> PRT
 <213> maize

<400> 9

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20 25 30	
Pro Val His Leu Pro Pro Pro Val His Leu Pro Pro Pro Val His Leu	
35 40 45	
Pro Pro Pro Val His Leu Pro Pro Pro Val His Leu Pro Pro Pro Val	
50 55 60	
His Leu Pro Pro Pro Val His Val Pro Pro Pro Val His Leu Pro Pro	
65 70 75 80	
Pro Pro Cys His Tyr Pro Thr Gln Pro Pro Arg Ile Glu Phe Lys Pro	
85 90 95	
Lys Pro Lys Pro Lys Pro Lys Glu Phe Lys Pro Lys Pro Lys Pro Lys	
100 105 110	
Pro Lys Glu Phe Leu Gln Pro Leu Gln Gly Thr Cys Gly Val Gly Ser	
115 120 125	
Thr Pro Ile Leu Gly Gln Cys Val Glu Phe Leu Arg His Gln Cys Ser	
130 135 140	
Pro Thr Ala Thr Pro Tyr Cys Ser Pro Gln Cys Gln Ser Leu Arg Gln	
145 150 155 160	
Gln Cys Cys Gln Gln Leu Arg Gln Val Glu Pro Gln His Arg Tyr Gln	
165 170 175	
Ala Ile Phe Gly Leu Val Leu Gln Ser Ile Leu Gln Gln Gln Pro Gln	

180 185 190
 Ser Gly Gln Val Ala Gly Leu Leu Ala Ala Gln Ile Ala Gln Gln Leu
 195 200 205
 Thr Ala Met Cys Gly Leu Gln Gln Pro Thr Pro Cys Pro Tyr Ala Ala
 210 215 220
 Ala Gly Gly Val Pro His
 225 230

<210> 10
 <211> 723
 <212> DNA
 <213> Maize

<220>
 <221> CDS
 <222> (1)...(723)

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 Met Arg Val Leu Leu Val Ala Leu Ala Leu Ala Leu Ala Ala Ser
 1 5 10 15

 gcc acc tcc acg cat aca agc ggc ggc tgc ggc tgc cag cca ccg ccg 96
 Ala Thr Ser Thr His Thr Ser Gly Gly Cys Gly Cys Gln Pro Pro Pro
 20 25 30

 ccg gtt cat cta ccg ccg ccg gtg cat ctg cca cct ccg gtt cac ctg 144
 Pro Val His Leu Pro Pro Pro Val His Leu Pro Pro Pro Val His Leu
 35 40 45

 cca cct ccg gtg cat ctc cca ccg ccg gtc cac ctg ccg ccg ccg gtc 192
 Pro Pro Pro Val His Leu Pro Pro Pro Val His Leu Pro Pro Pro Val
 50 55 60

 cac ctg cca ccg ccg gtc cat gtg ccg ccg ccg gtt cat ctg ccg ccg 240
 His Leu Pro Pro Pro Val His Val Pro Pro Pro Val His Leu Pro Pro
 65 70 75 80

 cca cca tgc cac tac cct act caa ccg ccc cgg cct cag cct cat ccc 288
 Pro Pro Cys His Tyr Pro Thr Gln Pro Pro Arg Pro Gln Pro His Pro
 85 90 95

 cag cca cac cca tgc ccg tgc caa cag ccg cat cca agc ccg tgc cag 336
 Gln Pro His Pro Cys Pro Cys Gln Gln Pro His Pro Ser Pro Cys Gln
 100 105 110

 atc gaa ttc aaa cca aag cca aag ccg aag cca aaa gaa ttc ctg cag 384
 Ile Glu Phe Lys Pro Lys Pro Lys Pro Lys Pro Lys Glu Phe Leu Gln
 115 120 125

 ccc ctg cag gga acc tgc ggc gtt ggc agc acc ccg atc ctg ggc cag 432
 Pro Leu Gln Gly Thr Cys Gly Val Gly Ser Thr Pro Ile Leu Gly Gln
 130 135 140

 tgc gtc gag ttt ctg agg cat cag tgc agc ccg acg gcg acg ccc tac 480
 Cys Val Glu Phe Leu Arg His Gln Cys Ser Pro Thr Ala Thr Pro Tyr
 145 150 155 160

tgc tgc cct cag tgc cag tgc ttg cgg cag cag tgt tgc cag cag ctc	528
Cys Ser Pro Gln Cys Gln Ser Leu Arg Gln Gln Cys Cys Gln Gln Leu	
165 170 175	
agg cag gtg gag ccg cag cac cgg tac cag gcg atc ttc ggc ttg gtc	576
Arg Gln Val Glu Pro Gln His Arg Tyr Gln Ala Ile Phe Gly Leu Val	
180 185 190	
ctc cag tcc atc ctg cag cag cag ccg caa agc ggc cag gtc gcg ggg	624
Leu Gln Ser Ile Leu Gln Gln Gln Pro Gln Ser Gly Gln Val Ala Gly	
195 200 205	
ctg ttg gcg gcg cag ata gcg cag caa ctg acg gcg atg tgc ggc ctg	672
Leu Leu Ala Ala Gln Ile Ala Gln Gln Leu Thr Ala Met Cys Gly Leu	
210 215 220	
cag cag ccg act cca tgc ccc tac gct gct gcc ggc ggt gtc ccc cac	720
Gln Gln Pro Thr Pro Cys Pro Tyr Ala Ala Ala Gly Gly Val Pro His	
225 230 235 240	
tga	723
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<210> 11
 <211> 240
 <212> PRT
 <213> Maize

<400> 11

Met Arg Val Leu Leu Val Ala Leu Ala Leu Leu Ala Leu Ala Ala Ser	
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Pro Val His Leu Pro Pro Pro Val His Leu Pro Pro Pro Val His Leu	
35 40 45	
Pro Pro Pro Val His Leu Pro Pro Val His Leu Pro Pro Pro Val	
50 55 60	
His Leu Pro Pro Pro Val His Val Pro Pro Pro Val His Leu Pro Pro	
65 70 75 80	
Pro Pro Cys His Tyr Pro Thr Gln Pro Pro Arg Pro Gln Pro His Pro	
85 90 95	
Gln Pro His Pro Cys Pro Cys Gln Gln Pro His Pro Ser Pro Cys Gln	
100 105 110	
Ile Glu Phe Lys Pro Lys Pro Lys Pro Lys Pro Lys Glu Phe Leu Gln	
115 120 125	
Pro Leu Gln Gly Thr Cys Gly Val Gly Ser Thr Pro Ile Leu Gly Gln	
130 135 140	
Cys Val Glu Phe Leu Arg His Gln Cys Ser Pro Thr Ala Thr Pro Tyr	
145 150 155 160	
Cys Ser Pro Gln Cys Gln Ser Leu Arg Gln Gln Cys Cys Gln Gln Leu	
165 170 175	
Arg Gln Val Glu Pro Gln His Arg Tyr Gln Ala Ile Phe Gly Leu Val	
180 185 190	
Leu Gln Ser Ile Leu Gln Gln Gln Pro Gln Ser Gly Gln Val Ala Gly	
195 200 205	

Leu	Leu	Ala	Ala	Gln	Ile	Ala	Gln	Gln	Leu	Thr	Ala	Met	Cys	Gly	Leu
	210					215					220				
Gln	Gln	Pro	Thr	Pro	Cys	Pro	Tyr	Ala	Ala	Ala	Gly	Gly	Val	Pro	His
225					230					235					240